

What is Claimed is:

1    1.    A system for reducing noise in a wideband signal having at least one narrow frequency  
2    component comprising:

3                a filterbank comprising a first filter having a first frequency and a first output and a  
4    second filter having a second frequency and a second output, wherein the phases of said first  
5    frequency and said second frequency differ by 180 degrees about a third frequency;

6                a running cross-correlator interconnected to said first filterbank for comparing said first  
7    output of said first filter and said second output of said second filter; and

8                an analysis-synthesis filterbank for attenuating said wideband signal at said third  
9    frequency in response to said running cross-correlator.

1    2.    The system of claim 1, further comprising first and second saturating non-linearity  
2    components interconnecting said first filter and said second filter, respectively, to said running  
3    cross-correlator.

1    3.    The system of claim 2, wherein said first and second saturated non-linearity components  
2    are signum functions.

1    4.    The system of claim 1, wherein said running cross-correlator comprises a cross-correlator  
2    interconnected to a low-pass filter.

1    5.    The system of claim 1, wherein said second filterbank attenuates said third frequency only  
2    when said running cross-correlator has a reduced response.

- 1       6.     A method for reducing noise in a wideband signal, comprising the steps of:
- 2           (a)   filtering said wideband noise at a first frequency to produce a first filter output;
- 3           (b)   filtering said wideband noise at a second frequency to produce a second filter
- 4       output, wherein the phases of said first frequency and said second frequency differ by 180
- 5       degrees about an intermediate third frequency;
- 6           (c)   performing a running cross-correlation of said first filter output and said second
- 7       filter output; and
- 8           (d)   attenuating said wideband signal at said third frequency according to said running
- 9       cross-correlation.
- 1       7.     The method of claim 6, further comprising the step of transforming said first filter output
- 2       and said second filter output with a saturated non-linearity component function prior to
- 3       performing said running cross-correlation.
- 1       8.     The method of claim 6, further comprising the step of amplifying said wideband signal at
- 2       said third frequency if said running cross-correlation has a low value.

1    9.    The method of claim 6, further comprising the steps of  
2        (a)    filtering said wideband noise at a fourth frequency to produce a fourth filter  
3        output;  
4        (b)    filtering said wideband noise at a fifth frequency to produce a fifth filter output,  
5        wherein the phases of said fourth frequency and said fifth frequency differ by 180 degrees at an  
6        intermediate sixth frequency;  
7        (c)    performing a running cross-correlation of said saturated fourth filter output and  
8        said saturated fifth filter output; and  
9        (d)    attenuating said wideband signal at said sixth frequency according to said running  
10      cross-correlation.

1    10.   The method of claim 9, further comprising the step of combining the attenuated signals of  
2        steps (d) and (j).

1    11.   The method of claim 6, wherein the step of attenuating said wideband signal at said third  
2        frequency according to said running cross-correlation comprises passing said wideband signal  
3        through an analysis-synthesis filterbank.